# Achievement and maintenance of high quality resuscitation skills: Automated Learning with an Interactive Virtual Environment (ALIVE).

Good cardiopulmonary resuscitation (CPR) contributes to better outcomes after cardiac arrest, therefore effective training of lay and healthcare providers is essential. Current training strategies such as instructor-led courses, DVD-learning or self-learning (SL) methods using a manikin linked to a computer lack efficacy and do not contain strategies for individual long-term skills mastery. Based on the principles of mastery learning, we therefore developed innovative software solutions called ALIVE (Automated Learning with an Interactive Virtual Environment). ALIVE combines different learning strategies in order to achieve and maintain high quality resuscitation skills.

In a non-inferiority trial we showed that acquiring CPR skills with video instruction followed by voice feedback exercises was equal to skills acquired by instructor-led training.[1] Two further trials investigated the most effective SL strategy to acquire or retrain CPR skills.[2,3] For skills acquisition, video training appeared to be insufficient and needed to be followed by voice feedback exercises.[2,3] Voice feedback exercises were also most effective to retrain CPR skills.[3] We developed an automated assessment procedure to identify individuals requiring additional training and found this approach to be technically feasible, efficient and user-friendly.[4]

This knowledge culminated in an automated training strategy consisting of multiple short sessions followed by assessment with feedback against a predefined competence level.[5] A maximum of four short SL sessions led to compression skills

competency in 99% of lay participants and after five months, retention of compression depth and complete release was more than 80%. However, the skill decay present after five months, indicates the importance of regular assessment and retraining.[5] A similar strategy using automated assessment with feedback was effective to detect professionals needing CPR retraining and to improve their skill level compared to a predefined bench.[6]

Our future research is directed toward improving the interactivity and adaptiveness of the ALIVE software.

**Publication track record**

1. Mpotos N, Lemoyne S, Calle PA, Deschepper E, Valcke MA, Monsieurs KG. Combining video instruction followed by voice feedback in a self-learning station for acquisition of Basic Life Support skills: a randomised non-inferiority trial. Resuscitation 2011;82:896-901.

2. Mpotos N, De Wever B, Calle PA, Valcke MA, Peersman W, Monsieurs KG. Acquiring basic life support skills in a self-learning station: video alone is not enough. Eur J Emerg Med 2012 (article in press).

3. Mpotos N, Yde L, Calle PA, Deschepper E, Valcke MA, Peersman W, Herregods L, Monsieurs KG. Retraining basic life support skills using video, voice feedback or both: a randomised controlled trial. Resuscitation 2013;84:72-7.

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5. Mpotos N, De Wever B, Cleymans N, Raemaekers J, Valcke M, Monsieurs KG. Efficiency of short individualised CPR self-learning sessions with automated assessment and feedback. Resuscitation 2013 doi: 10.1016/j.resuscitation.2013.02.020.

6. Mpotos N, Van Belleghem V, Decaluwé K, Cleymans N, Raemaekers J, Derese A, De Wever B, Valcke M, Monsieurs KG. Automated testing and retraining to improve the CPR competency of emergency nurses: a feasibility study. Journal of Emergency Nursing 2013 (submitted).

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